9.4.2 Contact efficiency for lateral square mesh panels in a Spanish otter trawl: Does the lateral position enhance the fish contact probability?

Juan Santos[1]*, Bent Herrmann[2,3], Pascual Otero[4], Jose García[5] and Nélida Pérez[6]

1. Thünen-Institute of Baltic Sea Fisheries, Alter Hafen Süd 2, 18069 Rostock, Germany
2. SINTEF Fisheries and Aquaculture, Fishing Gear Technology, Willemoesvej 2, 9850 Hirtshals, Denmark
3. The Arctic University of Norway, UiT, Breivika, N-9037 Tromsø, Norway.
4. Tecnopesca PYM, S.L., C/ Rosalía de Castro, 147 36003 Pontevedra, Spain
5. ARVI, Cooperativa de Armadores de Pesca del Puerto de Vigo, Puerto Pesquero, Edificio Ramiro Gordejuela, 36202, Vigo-Pontevedra, Spain
6. Instituto Espanol de Oceanografía, C.O. Vigo, Subida a Radio Faro, 50–52, 36390 Vigo, Spain

* Corresponding author. Tel.: +49 (0) 381 - 8116 122, E-mail: juan.santos@ti.bund.de

Square Mesh Panels (SMP) are often integrated into trawl sections ahead of a diamond mesh codend in an attempt to improve release efficiency of undersized individuals of some species. Often these release panels are integrated in the upper panel of the trawl. This is the case for some trawl mixed fisheries in western European Atlantic waters, where a diamond mesh codend with 70 mm mesh size can be applied conditioned that

a SMP with at least 100 mm mesh size is integrated into the upper panel ahead of the codend. One of the main purposes of this SMP configuration is to avoid catches of undersized hake for which the 70 mm diamond mesh codend is known to have insufficient release potential. The main requirement for these SMP's to work efficiently it that a large fraction of fish i) notice the presence of the selection device in the top panel, and ii) react to the presence of the SMP altering their swimming direction upwards to encounter it. However, experimental fishing studies testing the mentioned SMP configuration has shown very low release efficiency for different species, such as hake (*Merluccius merluccius*). Some of those studies have shown that most of the hake simply do not make contact with the square mesh panel in this position during their drift towards the codend. Based on these poor results we designed and tested a new selective device named SLEP (Side Long Escapement Panels). The novelty of the new gear design is the position of the SMPs as they are fitted into the lateral sides of the aft part of the belly section. This position for the SMP's was selected based on information provided by fishers collaborating in the design stage, who in their normal fishing activities observed that a large proportion of fish meshed in the netting when they pull the gear up are found in the sides of the gear. Such observations indirectly indicate that many fish come into contact with the netting at the position the SLEP was finally positioned. Contrary to inserting SMP´s in the top panel, the effectiveness of this device does not rely on changes in fish swimming direction under the presence of the SMP's, but on using the longitudinal swimming path towards the codend expected in normal catch process. The SLEP concept is completed by the insertion of two net pieces forming a V-shaped panel in the belly section, with the aim of guiding fish to the sides to increase the fish contact likelihood with SLEP further.

SLEP was mounted and tested in a Demersal Otter Trawl commonly used in the trawl fishery operating in Divisions VIIIc-West and IXa-North (OTB_DEF_55), targeting a mixture of demersal species including Anglerfish (*Lophius* spp.), Hake, Megrim (*Lepidorhombus boscii*) and Nephrops (*Nephrops novergicus*). The fishery is known to present high discard rates, estimated to be between 30%-60% of the total catch. By species, the high discard values for Hake juveniles have been identified as a key factor causing the failure of this species recovery plan (COM (2011) 260; UE 2005). The experimental sea trials were carried out from May 21th to 25th onboard the vessel "Nuevo San Cibrán", a 27.9m, 490HP otter trawler; chosen for being a representative vessel of the fishery. Two 5m long PE netting covers with 40 mm mesh size were attached to the sides of the belly where to retain all fish escaping trough SLEP, while the codend selectivity was avoided by using a small mesh cover. The sea trials resulted in 13 valid hauls, and the two compartment collected data were analysed using a structural model implemented in SELNET. Based on the data collected we quantified the contact probability, the fraction of individual fish, which during their drift towards the codend came into contact with the square mesh panels. The analysis revealed that 81% Hake, 61% Norwegian lobster, 26% Four-spot Megrim and 38% Blackmouth catshark (*Galeus melastomus*) contacted SLEP. Thus, the contact probability for the square mesh panels when integrated in the side panels by far exceeded that found by others when integrated in the top panel. This study was carried within the project "Desarrollo y experimentación en campaña de un arte selectivo para la pesquería de arrastre de litoral Cantábrico noroeste" funded by the Spanish Ministerio de Medio Ambiente y Medio Rural y Marino.

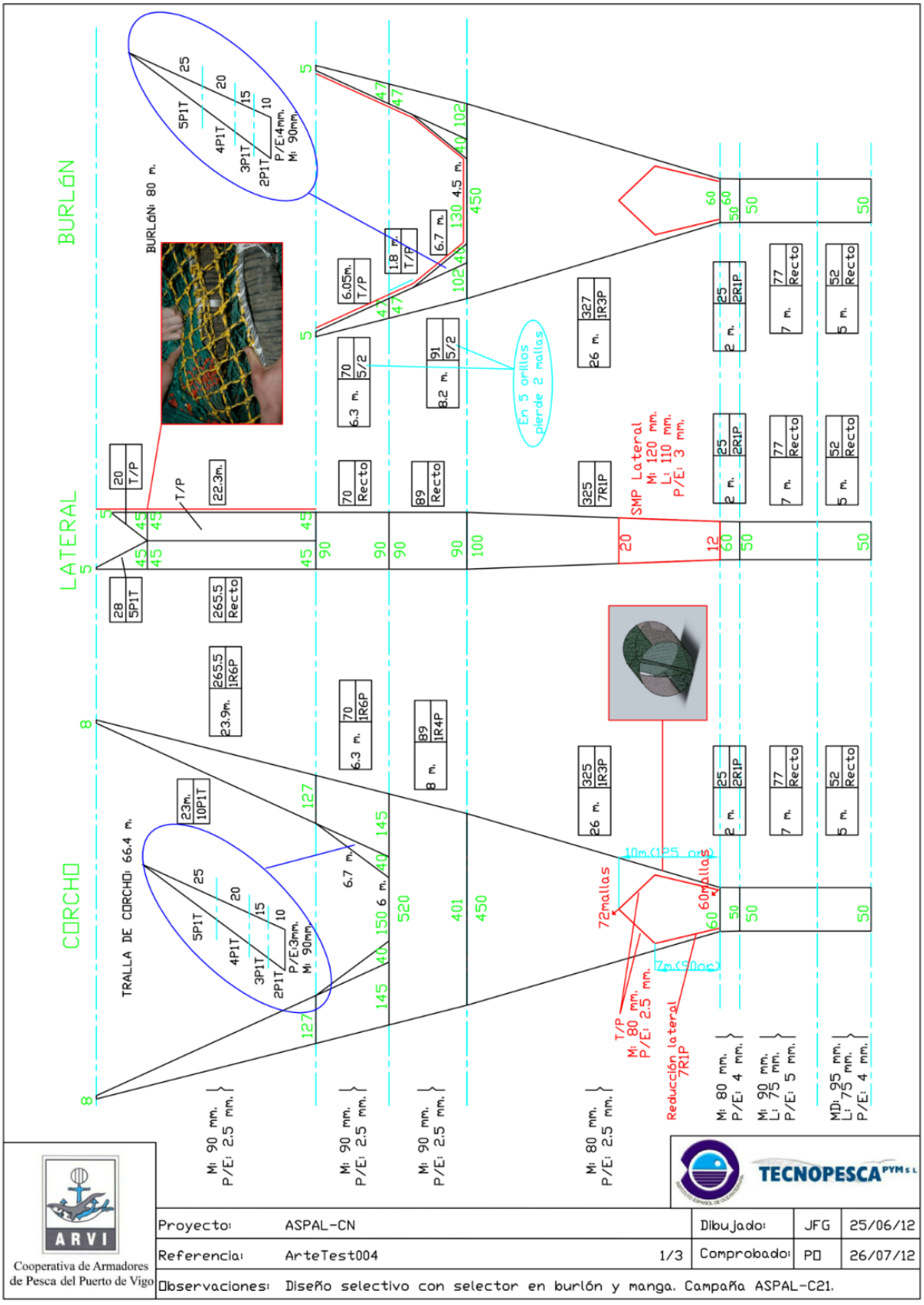

Figure 9.1. Drawing of net including of SLEP.

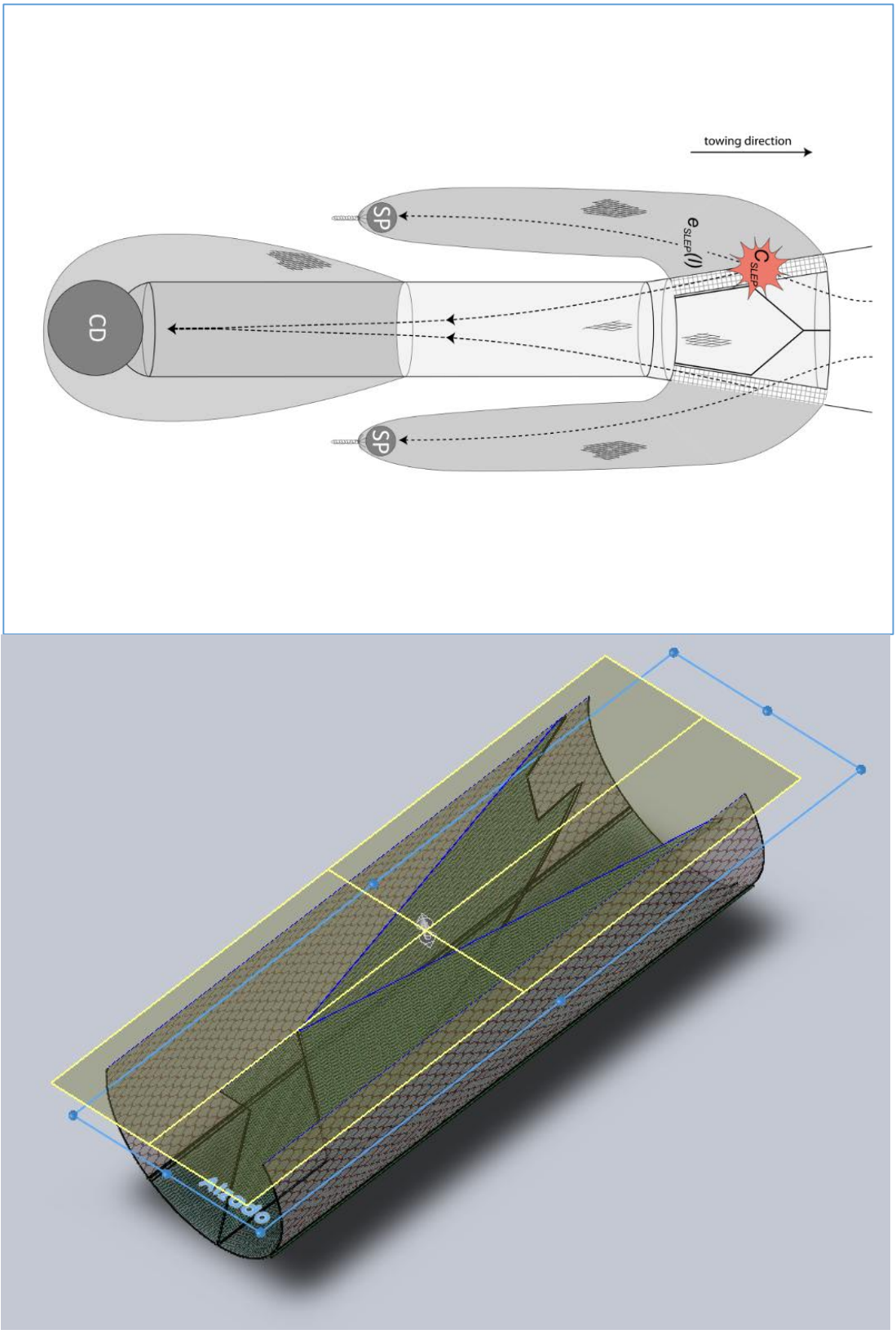

Figure 9.2. Schematic drawings of SLEP.